

CLAIMS:

1. A multilayer film comprising:

- i) a polymeric first layer having a first side and a second side;
- ii) a polymeric second layer, the second layer having a first side and second side, the second side of the second layer on a first side of the first layer;
- iii) a metal layer comprising a first side and a second side, the second side of the metal layer on the first side of the second layer; and
- iv) a transfer layer having a debonded surface and a metal-bonding surface, the metal bonding surface fixedly engaged on the first side of the metal layer.

2. The multilayer film according to Claim 1, wherein said transfer layer was formed on the second side of the first layer with the de-bonded surface of the transfer layer removably bonded on the second side of the first layer, and the transfer layer was thereafter transferred to and fixedly engaged on the first side of the metal layer following winding the film on a roll after the metal layer is applied to the second layer.

3. The film according to Claim 1 wherein the transfer layer comprises at least one of a heat sealable layer, a barrier layer and a printable layer.

4. The film according to Claim 1, wherein the debonded surface comprises an exterior surface of the film and is at least one of printable, sealable, and optionally may be laminated with another polymeric substrate.

5. The film according to Claim 1 in which the first layer comprises a polyolefin having a melting point from 125°C to 190°C.

6. The film according to Claim 5 in which the polyolefin comprises at least one of polyethylene, polypropylene and polybutylene.
7. The film according to Claim 5 in which the polyolefin comprises high density polyethylene.
8. The film according to Claim 1 in which the polymeric second layer is coextruded with the first layer.
9. The film according to Claim 1 in which the second polymeric layer comprises multiple layers.
10. The film according to Claim 1 in which the transfer layer was formed on the second side of the first layer by one of coextrusion with the first layer, lamination to the first layer, or as a coating on the first layer.
11. The film according to Claim 1 in which the transfer layer comprises a copolymer of ethylene and an unsaturated acid or ester.
12. The film according to Claim 11 in which the unsaturated acid comprises acrylic and or methacrylic acid.
13. The film according to Claim 11 in which the unsaturated ester comprises at least one of vinyl acetate, a C₁-C₄ acrylate or a C₁-C₄ methacrylate.
14. The film according to Claim 1 in which the metal layer comprises aluminum.
15. The film according to Claim 1 in which the metal layer is between 5 and 500 nanometers thick.
16. The film according to Claim 1 wherein the multilayer film further comprises a post-transfer coating on the second side of the polymeric first layer, when the transfer layer is on the side of the metal layer opposite to the second layer.

17. The film according to Claim 16 in which the post-transfer coating comprises at least one of a heat sealable layer and a printable layer.
18. The film according to Claim 16 in which the coating is of 1) comprises at least one of a copolymer of ethylene and vinyl acetate 2) or a C₁-C₄ acrylate or 3) a C₁-C₄ methacrylate.
19. The film according to Claim 1 further comprising at least one additional polymeric layer on the second side of the polymeric first layer.
20. The film according to Claim 19, wherein the at least one additional polymeric layer comprises a heat sealable layer, a barrier layer and a printable layer.
21. A film according to Claim 19 in which the heat sealable layer comprises a polyolefin of melting point from 5°C to 50°C lower than the melting point of the polymer of the first layer.
22. A film according to Claim 1 wherein at least one of the second side of the first layer and the first side of the second layer is treated by one of chlorination, oxidation, heat, steam, corona, flame and plasma treatment.
23. A film according to Claim 1 further comprising a primer applied to at least one of the first layer and the second layer.
24. A film according to Claim 23 in which the primer selected from at least one of polyethylene imine, titanates, and reaction products of epoxy resin and an aminoethylated vinyl polymer.
25. The film according to Claim 1 used to package an article.
26. The film according to Claim 1 used to label an article.
27. An intermediary film comprising:
 - i) a polymeric first layer having a first side and a second side;

ii) a transferrable transfer layer having a first side and a second side, the first side of the transfer layer being detachably engaged on the second side of the first layer; and

iii) a metal layer having a first side and a second side, the second side of the metal layer on the first side of the first layer.

28. The intermediary film according to Claim 27 wherein the transfer layer comprises at least one of a heat sealable layer, a barrier layer and a printable layer.

29. The intermediary film according to Claim 27 further comprising a polymeric second layer between the first side of the first polymeric layer and the metal layer.

30. The film according to Claim 27 in which the transferable transfer layer is

31. The film according to Claim 27 in which the transfer layer comprises a copolymer of ethylene and an unsaturated acid or unsaturated ester.

32. The process according to Claim 27 in which the transfer layer comprises water-based, solvent-based or solventless lacquers or inks, based on resins.

33. The film according to Claim 27 in which the transfer layer comprises

i) a copolymer of ethylene and vinyl acetate, or

ii) a C₁-C₄ acrylate or

iii) methacrylate.

34. The film according to Claim 27 in which the first layer comprises multiple layers.

35. The film according to Claim 27 in which the metal layer comprises aluminum.

36. The film according to Claim 27 in which the metal layer is an aluminum layer which is between 5 and 500 nanometers thick.

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37. The film according to Claim 27 further comprising a coating between the first layer and the transfer layer.
38. The film according to Claim 27 further comprising an additional layer between the first layer and the transferable transfer layer.
39. The film according to Claim 38 in which the additional layer comprises at least one of a heat sealable layer, a barrier layer, and a printable layer.
40. The film according to Claim 27 further comprising at least one additional layer on one or both surfaces of the first layer.
41. The film according to Claim 40 in which the at least one additional layer comprises an extrudable polymer.
42. The film according to Claim 27 further comprising a primer on at least one of
 - i) a surface engaged with the metal layer, and
 - ii) a surface of the metal layer.
43. The film according to Claim 42 in which the primer comprises one of polyethylene imine, titanates, and reaction products of epoxy resin and an aminoethylated vinyl polymer.
44. The film according to Claim 40 in which the at least one additional layer comprises an extrudable polymer having a melting point from 5°C to 50°C lower than the melting point of the polymer of the first layer.
45. The film according to Claim 27 in which at least one of the first layer, the second layer and the transfer layer is treated by one of chlorination, oxidation, heat, steam, corona, flame and plasma treatment discharge treated on one or both of its surfaces.
46. The film according to Claim 27 used to package an article.

47. The film according to Claim 27 used to label an article.

48. A multilayer film comprising:

- i) a polymeric first layer having a first side and a second side;
- ii) a metal layer comprising a first side and a second side, the second side of the metal layer on the first side of the first layer;
- iii) a transfer layer having a debonded surface and a metal-bonding surface, the metal bonding surface fixedly engaged on the first side of the metal layer;

wherein the transfer layer comprises one of a printable layer, a sealable layer and a barrier layer.

49. The multilayer film according to Claim 49, wherein said transfer layer was formed on the second side of the first layer with the de-bonded surface of the transfer layer removably bonded on the second side of the first layer, and the transfer layer was thereafter transferred to and fixedly engaged on the first side of the metal layer opposite to the second layer upon winding the film on a roll after the metal layer is applied to the second layer.

50. The film according to Claim 49, wherein the debonded surface comprises an exterior surface of the film and is at least one of printable, sealable, and optionally may be laminated with another polymeric substrate.

51. The film according to Claim 49 in which the first layer comprises a polyolefin having a melting point from 125°C to 190°C.

52. The film according to Claim 49 in which the polyolefin comprises at least one of polyethylene, polypropylene and polybutylene.

53. The film according to Claim 49 in which the polyolefin comprises high density polyethylene.

54. The film according to Claim 49 in which the polymeric second layer is coextruded with the first layer.
55. The film according to Claim 49 in which the second polymeric layer comprises multiple layers.
56. The film according to Claim 49 in which the transfer layer was formed on the second side of the first layer by one of coextrusion with the first layer, lamination to the first layer, or as a coating on the first layer.
57. The film according to Claim 49 in which the transfer layer comprises a copolymer of ethylene and an unsaturated acid or ester.
58. The film according to Claim 57 in which the unsaturated acid comprises acrylic and or methacrylic acid.
59. The film according to Claim 48 used to package an article.
60. The film according to Claim 48 used to label an article.